

**Two remarkable afromontane Theridiidae:
Proboscidula milleri n. sp. and *Robertus calidus* n. sp.
(Arachnida, Araneae)**

Barbara KNOFLACH
Institute of Zoology, University of Innsbruck,
Technikerstraße 25, A-6020 Innsbruck, Austria.

Two remarkable afromontane Theridiidae: *Proboscidula milleri* n. sp. and *Robertus calidus* n. sp. (Arachnida, Araneae). - Two new minute theridiid species are described from montane forests in Rwanda and Zaire and their genital morphology and relationships are discussed. *P. milleri* is the second species in this genus after the type species from Angola. *R. calidus* is the first afrotropical species in an otherwise holarctic genus. It is closely related to the western palaeartic species *R. neglectus* (O.P.-Cambridge).

Key-words: Araneae - Theridiidae - Taxonomy - Afromontane - *Proboscidula* - *Robertus*.

INTRODUCTION

In the linyphiid spider fauna of the African mountains both afrotropical elements as well as species with palaeartic relatives are present (HOLM 1962, SCHARFF 1992). Two minute theridiid species collected by E. Heiss in montane forests in Rwanda and Zaire which are described in the following pages show analogous relationships. The first one belongs clearly to the attractive genus *Proboscidula*, which was previously known only from Angola. The second species, *Robertus calidus*, is the first African representative of a hitherto holarctic genus.

ABBREVIATIONS

C conductor, E embolus, f tegular fold, Pc paracymbium, ST subtegulum, T tegulum, TA tegular apophysis. — MHNG Muséum d'histoire naturelle, Genève.

DESCRIPTIONS

***Proboscidula milleri* n. sp.** (Figs 1–16)

T y p e s : Rwanda, Nyakabuye, montane rain forest Cyamudongo, ca. 2000 m, 1 ♂ holotype, 1 ♀ paratype, early February 1986; 1 ♀ paratype, 20.–25. January 1984, leg. E. Heiss (MHNG).

Diagnosis: ♂ carapace with characteristic clypeal knob (Figs 1, 3, 5), legs I with conspicuous ventral spines (Fig. 4), abdomen with dorsal and ventral scutum, sternum covered with numerous glandular hairs (Fig. 2). ♂ palp with projecting tegular apophysis (Fig. 14). Females can be recognised by their epigyne/vulva (Figs 11, 12). *P. milleri* is separated clearly from the type species *P. loricata* Miller, 1970.

Etymology: This striking species is named in honour of Prof. F. Miller, Brno (1902–1983).

♂: Measurements (mm): carapace 0.53 long, 0.46 wide. Length of abdomen 0.71. Posterior end of sternum 0.14 wide.

Colour, pattern: Carapace brown, sides reticulate, lateral margins with dark seam, median area dark grey. Legs brown, trochanters, tibiae and distal part of femora light brown. Dorsum of abdomen dusky brown, light median band continuous with anterior light belt (Fig. 1). Sides of abdomen pale with a dark longitudinal stripe (Fig. 10). Venter pale, epigaster darkened. Spinnerets light brown.

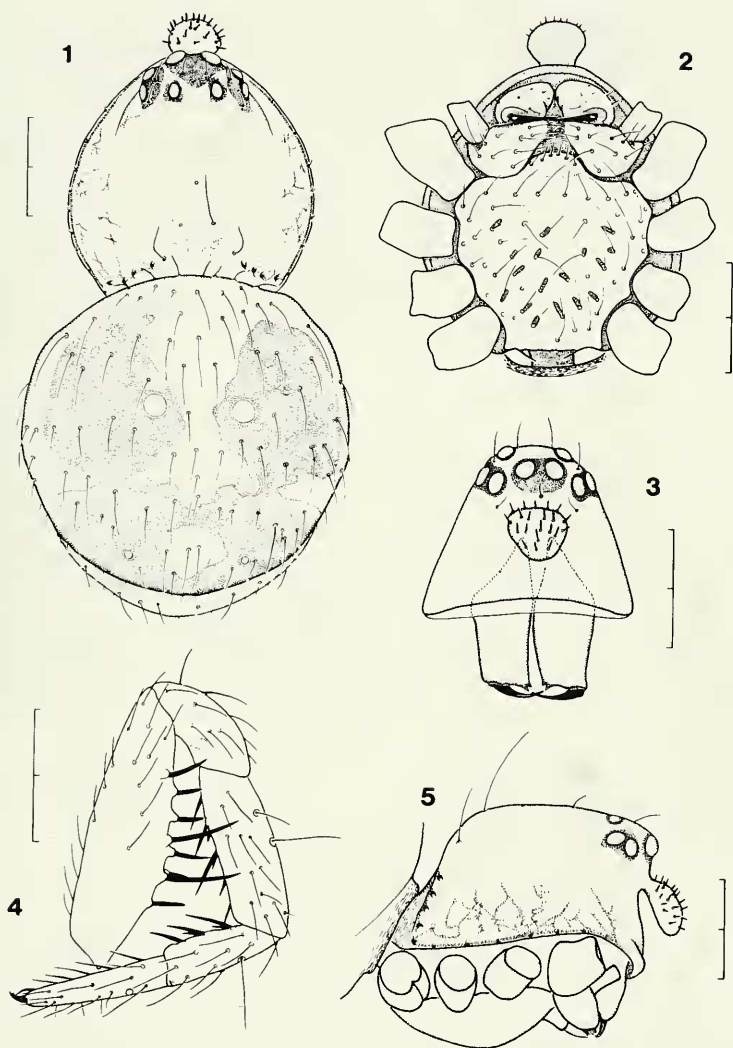
Carapace with conspicuous curved clypeal knob covered with stout spines (Figs 1–3, 5). Lateral margins of carapace with a row of very short hairs, median area with 5 long bristles. Eye region (Fig. 1) as in *P. loricata* (MILLER 1970). Chelicerae typically theridiid, with basal extension, anterior margin with two teeth (Fig. 3). Carapace elevated, posterior declivity steep (Fig. 5). Stridulatory organ well developed, not divided in midline, similar to *Robertus*. Anterior to stridulatory ridges at each side a row of 5–6 warts which form the bases of short hairs. Sternum vaulted, broadly truncate behind, twice as wide as diameter of coxa IV. Numerous modified hairs present, which may be glandular, for their bases show conspicuous tubes (Fig. 2). Labium not separated.

Abdomen with large dorsal scutum covering > 2/3 of its length and with ventral scutum from pedicel to epigastric furrow (Fig. 10). Dorsum smooth, with 3 pairs of impressed dots (Fig. 1). Branchial opercula and stigmata sclerotised. Spinnerets (Fig. 9) surrounded by small sclerotised ridges. Colulus large, 3 setae present. The two modified spigots of the posterior lateral spinnerets of the females could not be recognised.

Leg measurements (mm):

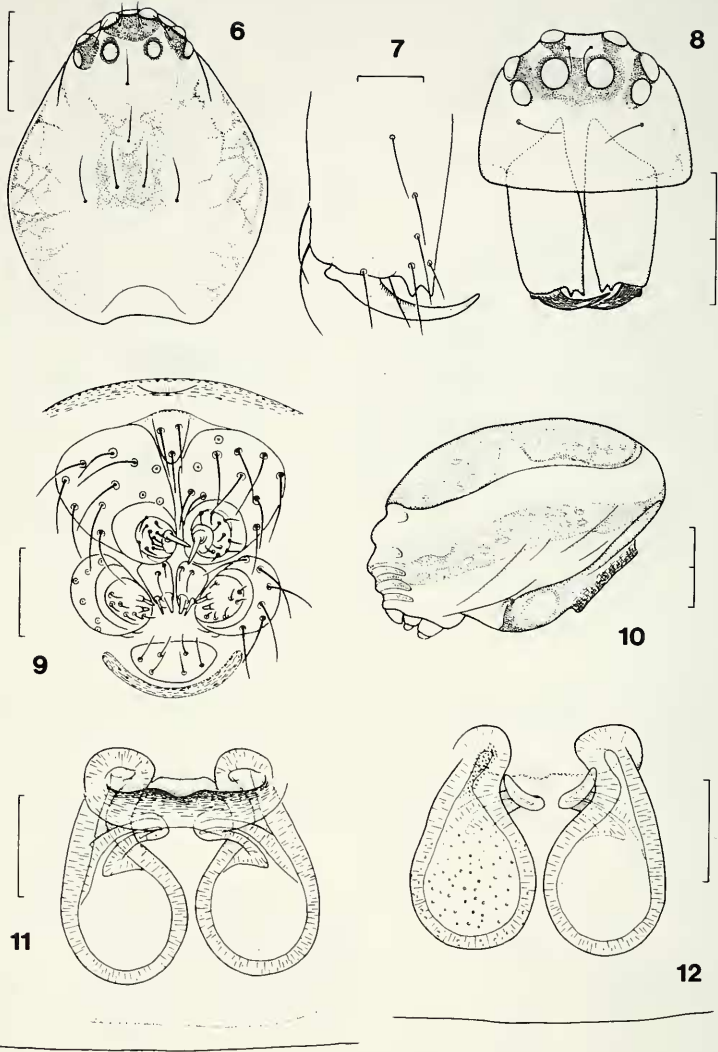
	Fe	Pa	Ti	Mt	Ta	Total
Palp	0.20	0.11	0.09	–	0.19	0.59
I	0.40	0.18	0.25	0.19	0.24	1.25
II	0.34	0.16	0.21	0.16	0.24	1.10
III	0.30	0.14	0.16	0.14	0.22	0.95
IV	0.44	0.17	0.26	0.20	0.27	1.33

Legs: 4123. Femora, tibiae and metatarsi of first leg ventrally with two rows of conspicuous spines (Fig. 4), their bases conical. Numbers of prodorsal/retrodorsal trichobothria of tibiae I–III 1/2, IV 2/2, their position on I 0.18/0.24;0.42, on IV 0.16;0.36/0.29;0.47. Metatarsi I–II with 1 trichobothrium (0.39; 0.32). Tarsal organ I–IV 0.25. Tarsi I–IV 1.3–1.5 times longer than metatarsi. Tarsal claws with ca. 3 minute teeth.



FIGS 1-5

Proboscidula milleri n. sp. Male. Dorsal view (1). Sternum and mouthparts (2). Carapace and chelicerae, frontal (3) and lateral view (5). Leg I (4). Scale lines 0.2 mm.



FIGS 6-12

Proboscidula milleri n. sp. Female (6-8, 11, 12). Male (9, 10). Carapace, dorsal (6) and frontal view with chelicerae (8). Right chelicera, frontal view (7). Spinnerets (9). Abdomen, lateral view (10). Epigyne/vulva, ventral (11) and dorsal view (12). Scale lines 0.2 mm (6, 8, 10), 0.05 mm (7, 9, 11, 12).

♂ Palp: Figs 13–16. Patella slightly widened. Tibia with 1 retrolateral trichobothrium. Cymbium plate-shaped, distally broad, not tapering (Figs 14, 16). Paracymbium in retrolateral-distal position, hook-like, locking with regular apophysis (Figs 14, 15). Subtegulum large, at dorsal side of bulb. Tegulum in retrolateral-ventral position, with wide retrolateral concavity which holds a projection of embolar base and is hidden by the cymbium (arrow, Fig. 13). Conductor and regular apophysis present. Conductor: dorsal, transparent, bandlike, supporting tip of embolus (Figs 13–15). Regular apophysis elongate, attached to tegulum on ventral side (M, Fig. 14) and enormously developed. Its characteristic prolateral angle extends beyond the cymbium (Figs 14, 16), retrolateral end with concavity into which fits the paracymbium. At the base of the regular apophysis a further small process is discernible beside the embolus (arrow, Fig. 14). Embolus: Fig. 14. Embolar base broad, rounded, attached to tegulum retrolaterally. Distal part very short, sperm duct with subterminal coil.

♀: Measurements (mm): Carapace 0.56 long, 0.52 wide. Length of abdomen 0.94. Posterior end of sternum 0.15 wide.

Colour, pattern: Coloration of carapace slightly stronger than in ♂, legs as in ♂. Abdomen dark, median light band clear, no lateral markings. Venter pale except one median greyish patch behind epigastric furrow.

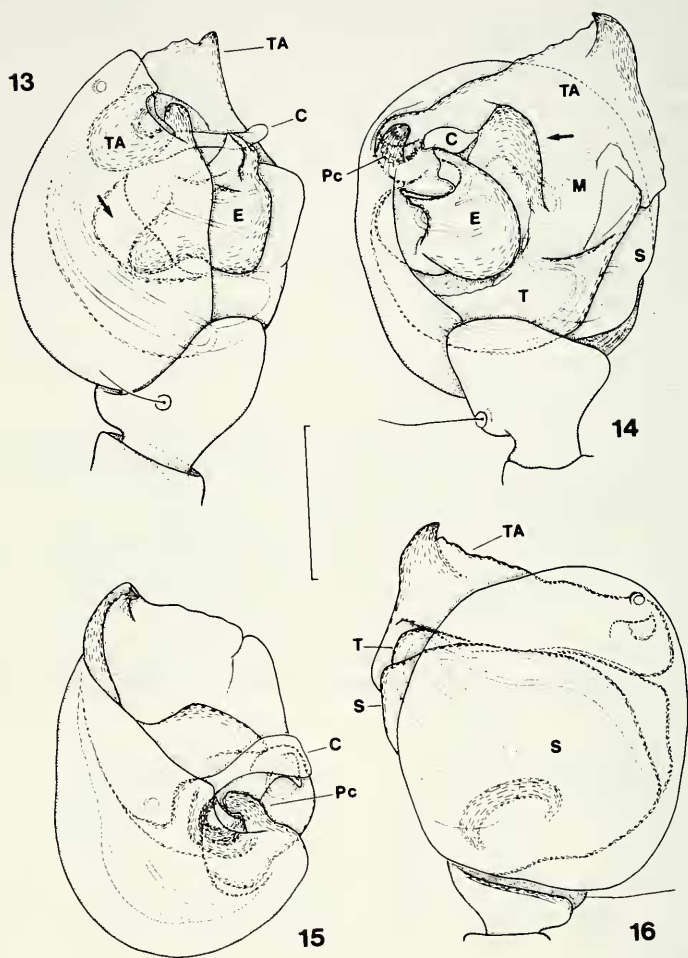
Carapace without knob (Figs 6, 8), stridulatory ridges on posterior declivity reduced. Chelicerae as in ♂ (Figs 7, 8). Sternum broadly truncate as in ♂, but without glandular hairs. Abdomen evenly and strongly sclerotised, regularly covered with small indentations, but without definite scutum. Branchial opercula and stigmata sclerotised, sclerotised ridges also present around spinnerets. Colulus as in ♂, posterior lateral spinnerets with two modified cylindrical spigots as is typical for theridiids.

Leg measurements (mm):

	Fe	Pa	Ti	Mt	Ta	Total
Palp	0.17	0.09	0.08	—	0.19	0.52
I	0.40	0.18	0.24	0.19	0.27	1.27
II	0.36	0.16	0.22	0.18	0.26	1.17
III	0.30	0.15	0.18	0.15	0.25	1.02
IV	0.41	0.18	0.30	0.19	0.28	1.35

Legs: 4123. Leg I without ventral spines. Trichobothria of tibiae as in ♂, position on I 0.18/0.24;0.43, on IV 0.19;0.36/0.38;0.58. Trichobothrium of metatarsi I–II 0.37;0.42. Tarsal organ I–IV 0.27–0.31. Leg IV with tarsal comb of 5 serrate bristles. Tarsal claws as in ♂.

Epigyne/vulva: Figs 11, 12. Epigyne with transverse, sclerotised edge, in front of which are the orifices of the copulatory ducts (Fig. 11). Receptacula seminis posterior to epigynal edge. Copulatory ducts short, leading straight backwards into the receptacula (Fig. 12). Fertilization ducts start on ventral side of receptacula and turn to the midline. Glandular pores present in receptaculum and copulatory duct (Fig. 12).



FIGS 13-16

Proboscidula milleri n. sp. Male palp, retrolateral (13), ventral (14), frontal (15) and dorsal view (16). Scale line 0.1 mm.

A f f i n i t i e s : The generic placement of *P. milleri* seems to be unambiguous as most characters mentioned in the diagnosis of MILLER (1970) are present, especially the peculiar clypeal projection of the ♂. Even the "glandular" hairs of the ♂ sternum were seen by MILLER (1970, "Doppeldellen"). Only the following hardly discernible characters differ: In *P. loricata* the colulus is said to be replaced by two setae, the chelicerae are not armed and the tarsal claws smooth.

P. milleri is smaller than *P. loricata*, its clypeal knob directed ventrally and bearing short setae. In *P. loricata* the knob is bent forwards and bears long hairs. The strong ventral spines of leg I of *P. milleri* were not mentioned for *P. loricata*. The tegular apophysis is long also in *P. loricata*, but extends laterally. Distal part of embolus and conductor are much longer. Therefore the copulatory ducts in the female of *P. loricata*, which is still unknown, can be expected to be longer than in *P. milleri*.

D i s t r i b u t i o n , h a b i t a t : Known only from the montane rain forest at Rwanda, Nyakabuye at about 2000 m. All specimens came from sieving bark and litter. The type species was likewise found under bark of *Brachistegia manga* in gallery forest of the river Luachimo, Dundo, Angola, at the end of February.

D i s c u s s i o n : *P. milleri* belongs to the group of theridiids with locking system A in the male palp (SAARISTO 1978), with hook-like paracymbium which anchors the tegular apophysis, the latter contains the sperm duct. Its colulus is relatively large and the stridulatory organ well developed as in most genera of this group which includes the former "Asageneae".

As already pointed out by MILLER (1970) and LEVI (1972) there are affinities to the South American genus *Wirada*. However, *Wirada* lacks a proboscis (LEVI 1963) and shows differences in the male palp: embolus strongly developed, conductor absent, two tegular apophyses discernible. The female's receptacula are anterior to the epigynal ridge. Similar modifications of the ♂ carapace are present also in *Craspedisia* (LEVI & LEVI 1962, LEVI 1963) and *Carniella* (THALER & STEINBERGER 1988), both of which have a large colulus, but their palpal structures are quite different. LEVI (1972) supports the generic rank of *Proboscidula*.

Robertus calidus n. sp.

(Figs 17–20)

♂ **H o l o t y p e :** Zaire, Prov. Kivu, Mt. Kahuzi, sieving bark and litter in bamboo zone (*Arundinaria alpina*) ca. 2300 m, early February 1986, leg. Heiss (MHNG).

D i a g n o s i s : *R. calidus* is closely related to *R. ueglectus* (O.P.-Cambridge). It differs by the following palpal structures: tegular apophysis distinct, embular base large, distal part of embolus long and slender, its tip narrow. ♀ unknown.

E t y m o l o g y : Latin *calidus*, *a, um* = hot (german: heiß). The specific name refers to both the occurrence of the species in a warm region as well as to its collector.

♂ **M e a s u r e m e n t s (m m) :** Carapace 0.94 long, 0.73 wide. Length of abdomen 0.89.

C o l o u r : Carapace and legs light brown, abdomen grey. Ocular area as in its congeners, fig. 260 in WIEHLE (1937). Stridulatory organ well developed, not divided in midline. Anterior margin of chelicerae with 3 teeth. Colulus large, 2 setae present.

Leg measurements (mm):

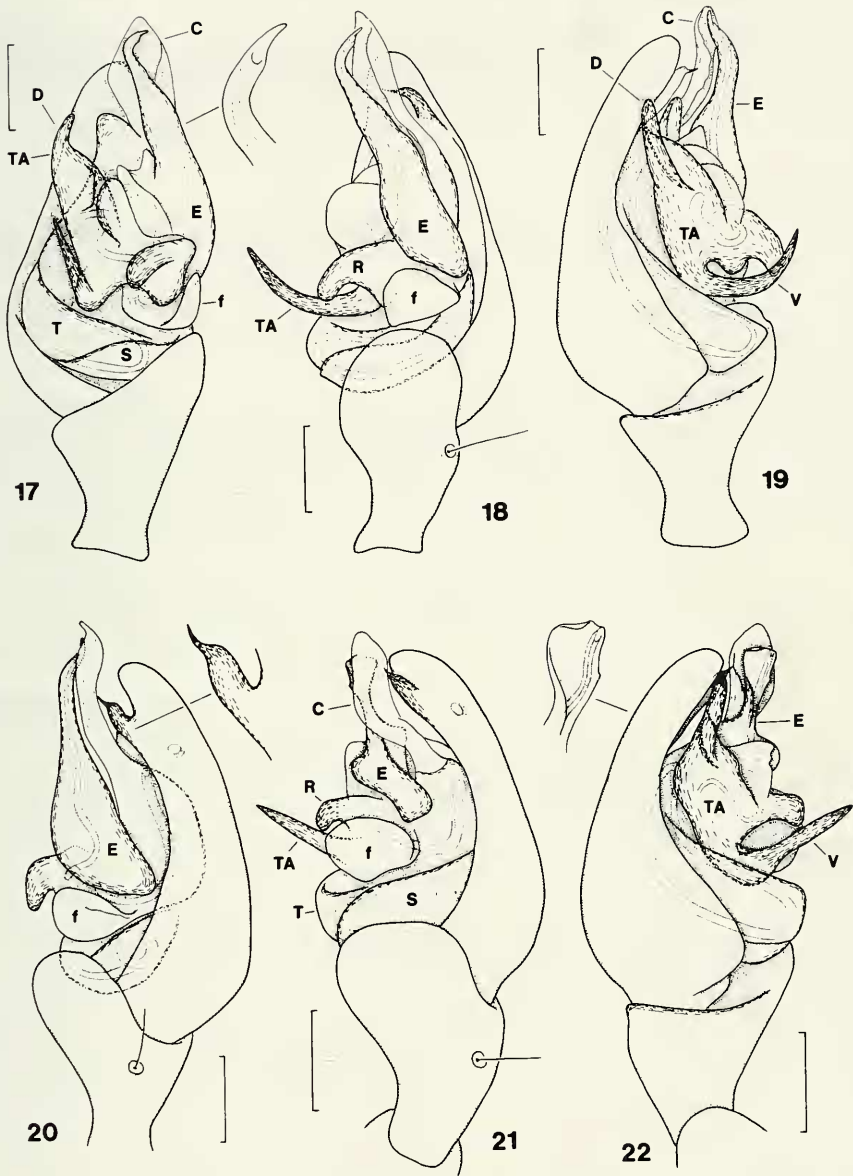
	Fe	Pa	Ti	Mt	Ta	Total
Palp	0.44	0.19	0.11	—	0.32	1.06
I	0.75	0.31	0.57	0.42	0.38	2.42
II	0.57	0.30	0.40	0.36	0.35	1.97
III	0.50	0.24	0.35	0.31	0.31	1.70
IV	0.78	0.30	0.58	0.40	0.38	2.44

Legs: 4123. Legs IV and I almost equal. Numbers of prodorsal/retrodorsal trichobothria of tibiae I–IV: 1/3, 1/2, 2/2, 2/3, their respective positions (0.34/0.26; 0.43;0.66), (0.29/0.30;0.58), (0.16;0.33/0.33;0.53), (0.25;0.42/0.41;0.54;0.73). Metatarsi I–III with trichobothrium, 0.45/0.42/0.44. Tarsal organ I (0.31), IV (0.26). Tarsi almost as long as metatarsi, I 0.90, IV 0.95. Tarsal claws I with 6 teeth.

♂ Palp: Figs 17–20, similar to *R. neglectus* (Figs 21, 22). Tibia with 1 retrolateral trichobothrium. Cymbium distally tapering, paracymbium retrolateral-subterminal and hook-like (Fig. 20). Tegulum with conductor, tegular fold and one tegular apophysis only. Dorsal part of tegulum bulging beside conductor (Fig. 17), which is a retrolateral projection of the tegulum (Fig. 20), membranous and lobe-like. Tegular fold (f): Figs 17, 18, transparent, lamelliform, as in *R. neglectus* (Fig. 21). Tegular apophysis situated prolaterally, with three branches diverging in dorsal, ventral and retrolateral directions (Figs 17, 18, 19; D, V, R). Dorsal branch with concavity which tilts over the paracymbium in the expanded palp. Ventral branch taxonomically important, long and curved, not straight as in *R. neglectus*. Retrolateral branch short and blunt. Sperm duct runs in a loop through tegular apophysis. Embolar base larger than in *R. neglectus* (Figs 18 vs. 21), distal part of embolus long and slender, its tip narrow (Figs 17 vs. 22). Sperm duct orifice terminal. In *R. neglectus* the embolar tip broadens and the sperm duct runs along one side.

D i s c u s s i o n : *Robertus* species occur mainly in Europe and North America and centres of endemism are in Europe, North America and East Siberia (ESKOV 1987). *R. calidus* is the first African representative. In palpal structure and trichobothriotaxy it is closely allied to the western palaeartic *R. neglectus*. They both belong, together with *R. scoticus* Jackson and *R. kuehnae* Bauchhenss & Uhlenhaut, to a species group with only 1 tegular apophysis which is strongly branched, and with a small and hyaline conductor.

Comparative characters of *R. neglectus*: Carapace 0.94 mm long, 0.69 mm wide. Legs 1423. Numbers of prodorsal/retrodorsal trichobothria of tibiae I–IV: 1/3, 1/2, 2/2, 2/3, their respective positions (0.38/0.25;0.46;0.67), (0.34/0.40;0.68), (0.17; 0.40/0.40;0.63). (0.24;0.43/0.45;0.62;0.82). Metatarsi I–III with trichobothrium (0.50/0.49/0.42). Tarsi almost as long as metatarsi, I 0.88, IV 0.92. Tarsal claws I with 6 teeth. ♂ palp: Figs 21, 22.



FIGS 17-22

Robertus calidus n. sp. (17-20). *Robertus neglectus* (O.P.-Cambridge) (21, 22). Left male palp, ventral (17), ventral-retrolateral (18), retrolateral (20, 21) and prolateral view (19, 22). Scale lines 0.1 mm.

ACKNOWLEDGEMENTS

I am grateful to Dr E. Heiss for collecting the material and for information. Many thanks are due to Dr K. Thaler for discussion and literature and to Dr P. Merrett for linguistic revision.

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